learis nerve is wanting; the ganglion of the fifth nerve is double; the glossopharyngeus appears to have no ganglion, but simply to pass thro' the vagus ganglion; and the hypoglossus in accordance with the observations of others has but one root, the ventral. This, however, divides into a dorsal and ventral ramus, and in the dorsal ramus a distinct ganglion is to be seen, thus restoring the hypoglossus in these forms to the type of the spinal nerves—an important observation.

On out-lying nerve cells in the mammalian spinal-cord. By CH S. SHERRINGTON. Phil. Trans. Roy. Soc., 1890. 2 plates.

The author has examined the cord in man, the monkey (Bonnet, Jew and Rhesus), and dog, using sections from the cords of the cat, lion, calf, rat, mouse, rabbit and guinea-pig for comparison. The cells in question are those which lie outside of the gray matter among the white fibres, and they are conveniently subdivided for description into ventral, lateral and dorsal groups. The cells in these several localities are described, and they appear in each case similar to the cells of that portion of the gray matter near which they lie. By far the most interesting is the dorsal cells, which in a given section are scattered from the point of entrance of the dorsal roots to the column of Clarke. There is some evidence that these cells are bipolar—as is also the case for the cells in the column of Clarke—and the suggestion is made that we may have here homologues of the spinal ganglion cells still included in the substance of the cord, a suggestion which has much in its favor. From the descriptive nature of the paper the evidence for this view cannot be abstracted with advantage.

Die Ringbänder der Nervenfaser. Mitgetheilt nach Untersuchungen von DR. JOHANSON durch JUSTUS GAULE. Centralbl. f. Physiologie, Aug., 1891. Heft 11.

The communication is preliminary to the fuller paper now in press. Its bearing may be briefly indicated as follows: If the nerve of a frog, or rabbit be hardened in Erlyk's fluid for 14 days, teased in water and stained for an hour with haematoxylin (alum .5%, Häm 20%), the axis cylinder is slightly tinged and at irregular intervals bands are darkly colored and are to be seen in the medullary sheath. This appearance it is argued is due to the presence here of some substance taking the haematoxylin stain and not to an insignificant deposit of the dye. These bands occupy the position of the well known clefts of Schmidt and Lantermann. They have a suggestion of fibres in them. Such is the appearance in May frogs. In June frogs the picture changes, and there is a clearly marked spiral fibre surrounding the nerve at these points. At this time, June, the axis cylinder of the nerves is small and shrunken. Later it assumes the full appearance found in the spring (May), frogs. This condition of the axis cylinders the authors associate with the proverbial misbehaviour of the June frogs when used for nerve-muscle work. It is also plain that this condition of the nerves occurs at the breeding season, and the influence of the reproductive process on these bands and the possibility of their being related to nuclear substances, are the aspects of the case which most interest Gaule.

The Journal of Comparative Neurology—a quarterly periodical devoted to the comparative study of the nervous system. Edited by C. L. HERRICK, Professor of Biology, etc., in the University of Cincinnati. Robert Clark & Co., Cincinnati, Ohio. Vol. I, No. 1, March; No. 2 June, 1891.

It is certainly desirable that the papers on comparative neurology should be grouped in some one publication, and the opportunity for this is offered by the new Journal. Original papers, reviews, notes on technique, bibliography and an editorial have formed the contents of the

numbers thus far issued. In the first number the editor comments on some of the open questions, and in the second, as bearing on the relations of neurology to psychology, gives an historical account of the ideas on localization of function in the brain.

Running through both numbers is a laborious study of the avian brain by C. H. Turner, in which, for one thing, he tests the taxonomic value of the brain of birds, with suggestive results. In the first number the editor writes on "Illustrations of the Architecture of the Cerebellum." Under this head he presents the view that the superficial layer of the cerebellar cortex—the molecular layer—is, in part at least, derived from cells forming the walls of the recessus lateralis—a view which certainly requires more evidence to support it than is here given.

The remaining papers, three in number, are studies in comparative anatomy.

A LABORATORY COURSE IN PHYSIOLOGICAL PSYCHOLOGY.

BY EDMUND C. SANFORD, PH. D.

(*Second Paper.*)

III.—TASTE AND SMELL.

SENSATIONS OF TASTE.

Apparatus. A potato and an apple; standard solutions of sweet, bitter, sour and salt; camel's-hair brushes; battery and zinc electrodes. The standard solutions should be made of two strengths, the stronger for testing the individual papillæ and the weaker for finding the least proportion tastable. The following proportions of tastable substances and water are convenient. Stronger solutions: Sugar, 40:100; Quinine, 2:100; Tartaric Acid, 5:100; Salt, saturated solution. Weaker solutions, (for which the water itself should be without taste): Sugar, 5:100; Quinine, 2:100 000; Tartaric Acid, 5:1000; Salt, 2:100. Special solutions of Sugar for Ex. 52: 20:100, 18:100, 16:100, 14:100, 12:100, 10:100.

49. Much of what is commonly called taste is really taste plus smell or touch or both. With the eyes shut and the nostrils held try to distinguish, by taste alone, between small quantities of scraped apple and potato, placed upon the tongue.

50. Distribution of the Organs of Taste. *a.* Using the weaker solutions and operating with a mirror or on another person, find out as nearly as you can in what part of the tongue the strongest sensations are produced by each. Test the tip, the sides, the back and the middle, putting on the solutions with a camel's-hair brush and rinsing the mouth as often as necessary. Try also the hard and soft palates. *b.* Dry the tongue with a handkerchief and test the individual fungiform papillæ with the stronger solutions, applying them with fine camel's-hair pencils. It will be found possible to get taste sensations from the single papillæ, though perhaps not all four from each. Rinse the mouth as needed. *c.* Test the surface of the tongue between the papillæ and observe that no taste sensations follow.

On *a* cf. Rittmeyer: Geschmacksprüfungen, Göttingen Diss. 1885. On *b* and *c* cf. Oehrwall, Untersuchungen über den Geschmackssinn, Scandinav. Archiv f. Physiol. Bd. II, 1890, pp. 1-69; see also abstract by the author in the Zeitschrift f. Psych., Bd. I, 1890, p. 141.

51. Minimal tastes. *a.* Find what is the greatest dilution of the weaker solutions in which the characteristic tastes can still be recognized. The same quantity, *e. g.*, half a teaspoonful, should be taken into the mouth at each trial and may be swallowed with advantage. Rinse